23 April 1969   *NPIC*

Goals

The following is a list of technical goals for our FY-71 budget:

1. Automatic Target Recognition

*Scan
of
Sort*

The goal for Automatic Target Recognition in general is to automate, or more likely semi-automate, those functions which are tedious, repetitive, and time-consuming, where the photo interpreter functions inefficiently and could be assisted by machines. The goal for this specific budgetary item for FY-71 is to further develop a cloud screener, which is a device to provide a 'yes or no' decision as to whether a target is cloud-covered or not. It would drive to pre-computed target locations on the film and then determine whether or not those specific targets are cloud covered. This device would be capable of scanning film at rates up to 100 ft. per minute. The device would be useable with either negative or positive film and the clue extraction processor could be weighted (biased) toward answering certain specific questions, such as weighting the clues for reprogramming instructions or for determining the degree of interpretability of the target.

2. P.I. Correlated Stereogram Maker

*View
+
D-D*

This device will acquire conjugate images from two separate frames, bring them to a common scale and a common rotation, remove any differences in X and Y translation, remove anamorphic distortion (i.e., differential X and Y), and then print these two corrected images on a common film format so that they could be subsequently viewed with relatively simple and inexpensive stereoscopes. Technical goals would be to produce a highly automated system which could find the conjugate images automatically, bring them to the printing head, and then print them with an absolute minimum loss in information content. It is intended that this be accomplished quickly and efficiently enough so that one unit could supply stereograms for up to 50 or 60 photointerpreters. The greatest technical difficulty is in maintaining maximum modulation transfer function due to the large volumes of glass in the optical system of the printer.

3. Ultra Violet Rear Projection Viewer

*V
of
D*

The technical goal is to develop a rear projection viewer utilizing an ultraviolet projection light source and a fluorescent screen. This viewer would be capable of presenting more than 200 lines per millimeter resolution at the screen with little, or no, loss in image contrast. The screen would be capable of being viewed by more than one person from reasonable angles, off-axis, without appreciable loss in either contrast or light intensity.

SECRET

4. Imagery Interpretation Research

This program is much too broad to lend itself well to establishing specific technical goals. The human interpreter and photogrammetrist are fundamental to the Center's entire operations. A thorough understanding of the photo interpretation and of the photogrammetric processes is absolutely essential in establishing a sound technological base for all of our future research and development efforts.

5. Dry Silver and Non-Silver Processors

The technological goal here is to obtain photographic reproduction materials which are either dry-silver or dry non-silver, with resolution and gray scale (density) characteristics which are either equal to, or superior to, conventional, chemically processed silver halide films. These materials must be dry processed, use less silver, or no silver at all, and be economically practical. The ultimate goal is to eventually replace the majority of our chemical facilities currently required to process silver halide films. Long shelf life and archival quality are also prime requirements. Our ultimate goal is to produce a reversal material, e.g., a positive is produced from a positive and a negative from a negative--thereby eliminating one generation of reproduction materials.

6. Chip Storage and Retrieval

Studies conducted under FY-69 and FY-70 funding will establish the future technological goals for this particular program. The FY-71 funding is included for the development of techniques and equipment based upon the results of those studies.

7. Automatic Transport Materials

Once again, this funding is for equipment; the technical goals will be established under studies not yet conducted but planned for FY-70.

25X1

- 2 -

SECRET

9. Imagery Analysis

The Imagery Analysis program is a fundamental building block of technical understanding upon which other R&D projects related to viewing, mensuration and reproduction are based. A total understanding of the photographic image is essential to extracting the maximum intelligence from the collected image record. The only area which is currently specific enough to list technical goals for is the area of digital image restoration and manipulation. Here the main criteria is the development of a system consisting of: (1) an input device, (2) computer programs, and (3) an output device which permits us to input a photographic record into the computer for manipulation and then subsequently print it out in a permanent high quality record form. The main goal is to provide equipment that is of such high performance characteristics that the process of digitizing the photograph does not impose resolution or contrast restrictions on the final product, which would obviously tend to obviate the benefits of the computer manipulation.

10. Mensuration Equipment

The general technical objectives of this program are to improve current operational and developmental mensuration equipment. The specific areas that we would be attempting to improve upon are: (1) greater automation-- automatic equipment to help determine the density centroid of image edges, (2) better optics through applying the technology learned under our current developmental program for the fabrication of a Wide-Field High-Power Anamorphic Stereoviewer, (3) increased state-of-the-art in laser metrology, and (4) further refinements to the mechanical coordinate motions.

11. Precise Measurement Study

This is a very fundamental search to determine the weakest links in the total mensuration process so that we can develop future equipment which is no more accurate than is absolutely necessary to do the job. This is important since accuracy in mensuration equipment goes hand in hand with major increases in equipment cost. Our technical goals are to obtain the required answers to these fundamental questions. As such, this item does not lend itself well to a listing of specifications.

12. Photo Image Manipulation Viewer Study

This is a study designed to provide information to establish equipment specifications. The long-range goal is to develop a viewer which will allow us to: (1) observe an image, (2) readily change image contrast, (3) vary its gray scale, (4) sharpen image edges, and (5) otherwise manipulate the imagery in order to extract additional information content. A technical breakthrough will be required either in higher resolution, and better gray scale electronics, or in providing some new state-of-the-art optical approach.

- 3 -

SECRET

13. Automatic Dodging Equipment

The technical goal is to provide some of the advantages of LOGetronic type printers--in common use on mapping photography--in automatic dodging equipment capable of handling ultra-high resolution reconnaissance imagery.

14. Test & Evaluation Equipment

The goal is to develop those test techniques and test equipment necessary to thoroughly check out future items of research and development equipment programmed to come into the Center for Test and Evaluation. This includes: (a) obtaining better measurements of optical performance than are currently available; (b) developing special techniques and equipment for proving that our ultra-high quality developmental measuring equipments are performing to standards; and (c) the establishing of new standards in areas where none exists, e.g., special standards for dry silver materials which are heat processed and have some totally different characteristics than conventional silver halide materials.

- 4 -

SECRET